Appendix M – GPRA06 Estimate of Penetration of Generating Technologies into Green Power Markets

1. Introduction

The Green Power Market Model (GPMM or the model) identifies and analyzes the potential electric-generating capacity additions that will result from "green power" programs, which are not captured in the "least-cost" analyses performed by the National Energy Modeling System (NEMS) and the Market Allocation (MARKAL) model. The term "green power" is used to define power generated from renewable energy sources, such as wind, solar, geothermal, and various forms of biomass. The Green Power market is an increasingly important element of the national renewable energy contribution, with changes in the regulatory and legislative environment and the recent dramatic changes in natural gas prices slowly altering the size of this opportunity.

1.1 Target Markets

The GPMM attempts to quantify the size of the green power market opportunity for the GPRA Benefits Analysis process. The model projects green power-capacity additions resulting from both green power marketing programs available in deregulated markets, and utility green pricing programs offered in regulated markets. Electricity markets are now restructured and openly competitive in 17 states and the District of Columbia: Arizona, Connecticut, Delaware, Illinois, Maine, Maryland, Massachusetts, Michigan, New Hampshire, New Jersey, New York, Ohio, Oregon, Rhode Island, Pennsylvania, Texas, Virginia, and Washington D.C. Electric-market restructuring has been delayed or repealed in seven states: Arkansas, California, Montana, Oklahoma, Nevada, New Mexico, and West Virginia.[1]

Of the states with competitive electricity markets, green power marketing products are currently being offered in nine states and the District of Columbia: Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, Texas, Virginia, and Washington DC.[2] Green power pricing programs are being offered by utilities in 34 states: Alabama, Arizona, California, Colorado, Florida, Georgia, Hawaii, Idaho, Illinois, Indiana, Iowa, Kentucky, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, Montana, Nebraska, New Mexico, North Carolina, North Dakota, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, Wisconsin, and Wyoming.[3]

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[1] The Green Power Network, 2004, *Green Power Markets- Green Marketing*, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, available on the Internet at: http://www.eere.energy.gov/greenpower/markets/marketing.shtml.

[2] The Green Power Network, 2004, *Green Power Markets- Green Marketing*, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, available on the Internet at: http://www.eere.energy.gov/greenpower/markets/marketing.shtml.

[3] The Green Power Network, 2004, *Green Power Markets- Green Pricing*, U.S. Department of Energy, Office of Energy Efficiency and Renewable Energy, available on the Internet at: http://www.eere.energy.gov/greenpower/markets/pricing.shtml.

The GPMM estimates are provided to the National Renewable Energy Laboratory (NREL) and the Department of Energy (DOE), in terms of installed capacity (MW) and energy generation (kWh) for each renewable power technology, in a format compatible with NEMS.

The model was first developed in 2000, and many of the assumptions have been revised on an annual basis. Additionally, this year a systematic review and revision of the data inputs and methodology of the model was undertaken, including: a review of the recent literature on green power market developments and status of new and existing programs; an update of current state legislation on electricity market restructuring and access to green power programs either through regulated green pricing or competitive green marketing programs; an update of input data, from EIA and NREL, on demographic and demand data, and renewable energy technology characterizations; and conversion of all dollar values from 2000$ to 2004$, including data inputs on energy prices and technology costs.

Baseline Technology Improvements and Market Acceptance
A "base case" run of the GPMM was established this year for the first time. This version of the model uses the technology characterization from the FY2006 GPRA-Base Case run, and serves as the baseline reference for how green power marketing and green pricing programs would develop in the absence of efforts by the renewable energy programs. After this baseline was set, the "program case" was run, using the NREL and DOE projections for technology characterizations for renewable technologies that are used in the FY2006 GPRA- Program Case run. Additionally, the solar photovoltaic (PV) capacity additions from the Million Solar Roofs (MSR) program are included in the program case results of the GPMM. Instead of the entire capacity additions and energy generation from the program case run, only the difference between the base and program runs is credited to the renewable energy programs for the benefits calculations. These incremental results are then used by OnLocation Inc. and added to the FY2006 GPRA- Program Case run, to produce the renewable energy program benefits calculations.

1.2 Key Factors in Shaping Market Adoption

Price is the main factor in most electricity purchases where the customer has a choice in products offered. Aside from some reliability issues for a number of industrial and commercial customers, price is the one characteristic that is distinguishable between competing electric service programs. The electricity provided to the customer is the same regardless of which electric provider and package is selected (i.e., the lights come on when the switch is flipped). However, green power is one product that offers more than just the electricity to power a home or business. Green power is really the combination of the electricity produced by green technologies and the attributes associated with that generation (e.g., reduction in pollution and emissions, fuel diversity, and price stability). While green power is generally more expensive than conventional electricity packages, the additional nonprice factors provide an increased value of the product to the customer. Many residential customers choose green power to reduce their impacts on the environment and to help support the development of these emerging clean technologies. Additionally, a number of reasons exist for businesses to commit to purchasing green power, such as fostering good relations with their customers by enhancing their public

image, offsetting emissions from manufacturing or other business processes, enhancing the reliability of their power supply, and limiting exposure to fossil fuel price fluctuations.

However, the development of green power markets still faces a number of obstacles. Many renewable technologies are capital intensive, requiring high up-front costs, which hinder or reduce the potential financing mechanisms for development. Also, issues with reliability and predictability, as well as potential impacts on transmission system operations present further barriers to market adoption. To counter these obstacles, a number of government programs and incentives, from the federal down to the local level, have been initiated to stimulate the market. Additionally, aggregation of a number of customers, on the residential, commercial, industrial, and governmental levels, have allowed these groups to commit to significant purchases of green power at favorable rates, which has spurred further development of green power.

1.3 Methodology and Calculations

Time frame
The model projects increased capacity and electricity generated from green technologies for five-year periods from 2006 to 2035.

Technologies
Thirteen individual technologies, comprising five technology types, were selected as both green and commercially viable for this analysis. These are:

1) Biomass:	- Direct-Fired Biomass
	- Biomass Gasification
	- Landfill Gas
2) Geothermal:	- Flash Geothermal
	- Binary Geothermal
	- Hot Dry Rock
3) Concentrated Solar Power:	- Solar Thermal Trough
	- Solar Thermal Dish-Hybrid
	- Solar Central Receiver
4) Photovoltaics:	- Residential PV (Neighborhood)
	- Central Station PV (Thin Film)
	- Concentrator PV
5) Wind:	- Onshore Wind Turbines

Offshore wind technology characterizations are currently being added to the modeling capabilities of NEMS and MARKAL. However, the specifications of offshore wind turbines for the base case and program case runs were not available for inclusion in this year's GPMM. It is expected that this technology will be included in the FY2007 GPMM base and program runs.

Although the model was initially designed to distinguish between dispatchable and intermittent technologies, more recent versions of the model exclude this distinction. The original distinction was accomplished by adding an extra cost to intermittent technologies associated with "firming

up" the technologies' ability to provide a constant power supply. However, since green power programs only guarantee that a certain number or percentage of total kilowatt-hours generated will come from green sources over the course of a year, the developers of new green power do not have the incentive to include backup generation to provide a continuous source of power. Developers are therefore assumed to build the sites in least-cost fashion (i.e., without backup) and take the "green" electrons when and from where they are able.

Regions

The model is composed of regional segments, used to capture differences in the costs of competing technologies, resource availability, levels of participation in voluntary green marketing programs, and electricity demand by sector. U.S. Census regions are used in this model, as the availability of regional data often takes this format. Eight regions (the South Atlantic and East South Central regions are combined) are modeled independently, and then summed to produce national results (see Appendix A). The regions for this analysis are 1) New England, 2) Middle Atlantic, 3) East North Central, 4) West North Central, 5) South Atlantic and East South Central, 6) West South Central, 7) Mountain, and 8) Pacific.

This regional breakdown is different from the regional divisions of NEMS, however. In order to be hardwired into NEMS, the eight regional capacity projections must be converted to the 13 divisions used in NEMS. The NEMS divisions are based on the North American Electric Reliability Council's (NERC) regions. The names of these regions, and the conversion formulas from the census region breakdown, are documented in the model. Detailed results of the model are shown by NEMS Region in **Appendix B.**

Assumptions

The technology cost and performance characterizations for both the base and program cases were taken from FY2006 GPRA Base Case and Program Case input data, as provided by Frances Wood of OnLocation Inc., and the Assumptions to the AEO2004 document. All technology cost figures were converted to 2004$, using GPD price deflators.[4]

The fraction of each region assumed to have competitively set electricity rates, and therefore green marketing program access, is consistent with those used in the Annual Energy Outlook 2004 (AEO2004), as provided by Frances Wood of OnLocation Inc. The state-by-state access to utility green pricing programs, and customer participation rates, for both green marketing and green pricing programs, are taken from a 2001 NREL report, *Growing the Green Power Market: Forecasting the Impacts of Customer Demand for Renewable Energy*.[5] Access to green power programs in regulated markets, is assumed to start at 10% and increases by 5% each year to 55%. Meanwhile, in competitive markets, 100% of customers are assumed to have access to green market programs. Customer participation in regulated markets is assumed to start at 0.75% for residential customers in first year, increasing by 0.75% annually to 7.5% in the 10th year; while

[4] Office of Management and Budget, Budget of the United States Government: Fiscal Year 2005, Table 10.1—GROSS DOMESTIC PRODUCT AND DEFLATORS USED IN THE HISTORICAL TABLES: 1940–2009, available on the Internet at: http://www.gpoaccess.gov/usbudget/fy05/sheets/hist10z1.xls.

[5] Swezey, Blair, R. Wiser, M. Bolinger, and E. Holt, 2001, Growing *the Green Power Market: Forecasting the Impacts of Customer Demand for Renewable Energy*, National Renewable Energy Laboratory, US Department of Energy, NREL/TP-620-30101 LBNL-48611.

in competitive markets, customers participation is assumed to start at 1% and increase to 15% in the 15th year of open access. Nonresidential (i.e., commercial and industrial) customers are assumed to be a constant 25% of residential participation in both regulated and competitive markets. Commercial and industrial customers' participation rates are set at 16.7% and 8.3%, respectively, of their residential customers counterparts. A key assumption of the model is that all customers continue in the programs, once they have joined.

These access and participation rates are summed across the regions, and are prorated based on the electricity demand in each state compared to the region as a whole. Regional assumptions for restructuring, green power access, and customer participation rates are shown in Appendix C. Figure 1 shows the combined regional customer participation rates in both green power marketing and green pricing programs.

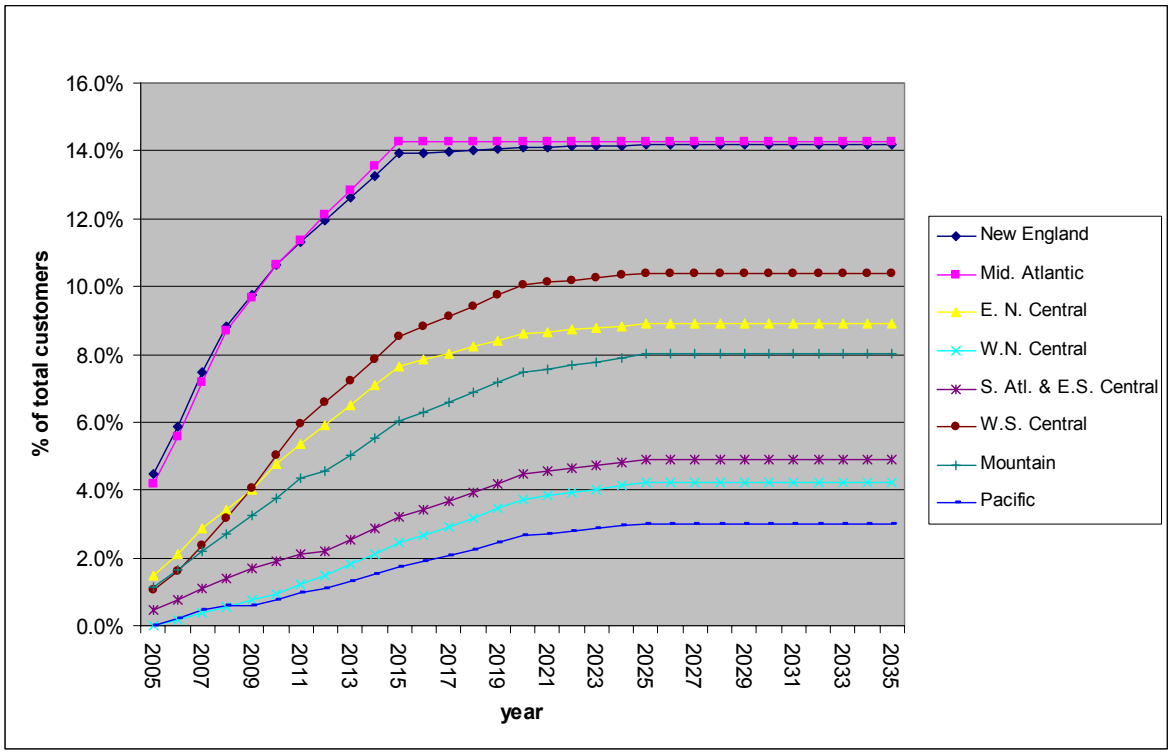

Figure 1. Total Regional Customer Participation Rates in Green Power Marketing and Green Pricing Programs

The choice of how to model the pricing premium for participation in green power programs is another important modeling assumption. The electricity purchased in a green power program is functionally equivalent to any other option offered by a utility or electric service provider. The nonelectric attributes of green power (i.e., from renewable energy sources with no or lower emissions than conventional fuel types) are the reason that customers are willing to pay a premium for this power. A range of payment methods exist for current green programs, with some programs charging an additional amount per kilowatt-hour, a fixed amount each month, or a percentage of the total bill. PERI has chosen to use the percentage of the total bill, assumed to be 10%, to more accurately show the regional energy price variation. The model uses only the

dollars from new customers joining green programs each year to build the new capacity. Money from customers who have joined in prior years is assumed to continue to finance projects built in those years. Further, it is assumed that all of the money collected from these programs will go toward building additional capacity.

A very important modeling construct allows the model to build multiple competing technologies in a region, not only the least-cost alternative. This approach avoids so-called knife-edge choices, and recognizes that single-point estimates of data actually represent a range of values. The percentage of funds apportioned to each technology is inversely related to its first-year cost of energy (FY COE) through a sharing algorithm (i.e., a logit function), consistent with NEMS modeling procedures. The spread of the distribution depends on a scaling factor, lambda, which often ranges from 0 to 15. As this factor increases, the lower-cost technologies receive a higher percentage of the total distribution. PERI has chosen to set this factor at 3.2. A small sensitivity analysis was conducted ranging lambda from 2 to 8 with minor impacts (less than 10%) on the resulting totals.

Another set of assumptions deals with creating regional distinctions in the model by varying the resource potential of the technologies. This was done both throughout the entire nation and in subsets of the regions, depending on the specific technology characterizations. Landfill gas, for example, is limited nationwide by the availability of an economically viable resource base. To account for this, a 70 MW capacity limit was instituted in each region for each five-year time period. For other technologies, such as CSP and geothermal, resource-based regional distinctions were introduced via adjustment factors (AF). For each technology, the capacity factors (CF) used in each run are multiplied by the AFs, in order to create the regional distinctions. An AF greater than one implies that the resource is more prevalent in a region; and, therefore, the cost of producing electricity from that technology is lower. The AFs are based on available resource levels as determined from resource maps in the Renewable Energy Technology Characterizations report.[6] The AFs for each region, and the subsequent regional CFs, are noted in **Appendix D**.

Additionally, certain technologies are excluded from regions, due to prohibitively high costs or the absence of a resource base, by setting their respective AFs to zero. **Table 1** documents these exclusions.

[6] U.S. Department of Energy/Electric Power Research Institute, 1997, *Renewable Energy Technology Characterizations*, Office of Utility Technologies, Energy Efficiency and Renewable Energy, U.S. Department of Energy, EPRI- TR109496.

Table 1. Regional Exclusions of Green Technologies in the FY06 GPMM

Technology	Region 1	Region 2	Region 3	Region 4	Region 5	Region 6	Region 7	Region 8
Direct-Fired Biomass								
Biomass Gasification								
Landfill Gas								
Flash Geothermal	X	X	X	X	X	X		
Binary Geothermal	X	X	X	X	X	X		
Hot Dry Rock	X	X	X	X	X	X		
Solar Thermal Trough								
Solar Thermal Dish Hybrid								
Solar Central Receiver	X	X	X		X			
Residential PV								
Central Station PV								
Concentrator PV								
Onshore Wind Turbines								

X- Indicates regions where technology is assumed to be unavailable.

Geothermal technologies are restricted to penetrate only in the Pacific and Mountain regions. Central receivers are restricted to regions west of the Mississippi, consistent with NEMS modeling procedures. Despite the fact that the central receiver technology is the only type of CSP technology modeled in NEMS, other CSP technologies (i.e., troughs and dishes) are allowed to compete more widely in the GPMM model. Although these CSP technologies are available in all regions, they are given substantial penalties in regions with lower solar insolation via the AFs. For example, the trough technology has a national average of 33% for its CF; however, due to the reductions introduced by the AFs for the New England and Middle Atlantic regions, the CF in these regions is about 23%. The reduction in CF also has the effect of increasing the COE, making this technology less competitive in these regions.

Annual Energy Outlook Inputs

The number of customers by economic sector for each region is determined by the number of residential housing units for the residential sector, the amount of commercial floor space for the commercial sector, and the industrial gross output for the industrial sector. This data is taken from the most recent Energy Information Administration's (EIA) assumptions for the *Annual Energy Outlook 2004, DOE/EIA-0383(2004)*.[7] The residential housing-units data was updated using data provided by EIA.[8] The commercial floor space and industrial gross output were updated from the AEO2004 supplemental data tables, Tables 22 and 23, respectively. The number of commercial establishments is calculated assuming 13,000 square feet per establishment; and the number of industrial establishments is calculated assuming $10 million of gross output per establishment. The regional energy consumption and prices were taken from Tables 1-20 of AEO2004 Supplemental Data Tables.

[7] Energy Information Administration, 2004, *Annual Energy Outlook 2004: With Projections to 2025*, Office of Integrated Analysis and Forecasting, US Department of Energy, DOE/EIA-0383(2004).

[8] Personal contact with EIA, June 25, 2004, John Cymbalsky sent housing data in Excel file "AEO 2004 households data- from J Cymbalsky- 6-25-04.xls".

Other Inputs

For the program case run, PERI includes additions to the green capacity and generation estimates to account for the Million Solar Roofs (MSR) program, as shown in **Table 2.** However, these additions are not included in the base case run, as they are expected to result from program actions and would not be expected to occur in the absence of the program. A primary means of deployment for PV is expected to be in distributed systems, which are customer-sited and customer-owned. This market for distributed systems will be easier for PV to compete in, because it allows PV to compete with retail electricity prices, not the very low competitive grid prices. The MSR initiative targets this application. The realization of MSR goals for PV (i.e., 600,000 systems installed by 2010) has formed the basis for the distributed power-penetration projections since the FY2001 GPRA benefits reporting. Projections beyond 2010 assume declining annual growth rates, as would be expected to occur after the end of a major initiative.

Table 2. Million Solar Roofs – Incremental Capacity Additions in the GPMM05

Year Period	FY2006 MSR Capacity Additions (above 2005 Baseline)
2006-2010	773
2011-2015	1,761
2016-2020	1,348
2021-2025	385
2026-2030	0
2031-2035	0
Total for 2006-2035	4,267

For both the base case and program case runs, the EIA "floors" builds are subtracted from the results of the model. EIA describes the inclusion of "Floors" capacity in the Renewable Fuels Module section of the *Assumptions to the Annual Energy Outlook 2004*, page 137, and in the *Model Documentation- Renewable Fuels Module of the National Energy Modeling System* report, page 81. "Recognizing that some new solar generating capacity is installed for reasons other than represented in the EMM, such as for market testing or unique economic requirements, EIA includes estimates of minimal new grid-connected generating capacity using solar resources."[9] An additional 332.5 MW of central station PV and 75.5 MW of central station solar thermal capacity are "assumed by EIA to be installed for reasons in addition to least-cost electricity supply," during the period 2001 to 2025.[10] **Table 3** shows the "floors" capacity additions, which are prorated for 2006 to 2025 and regionally divided among the regions that have capacity additions in these technologies.

[9] Energy Information Administration, 2004, *Model Documentation- Renewable Fuels Module of the National Energy Modeling System*, U.S. Department of Energy, DOE/EIA-M069(2004).

[10] Energy Information Administration, 2004, *Assumptions to the Annual Energy Outlook 2004- Renewable Fuels Module*, U.S. Department of Energy, DOE/EIA-0554(2004).

Table 3. EIA "Floors" Incremental Capacity Additions for PV and Solar Thermal in NEMS

Year Period	EIA PV "Floors" Capacity Additions (above 2005 Baseline)	EIA Solar Thermal "Floors" Capacity Additions (above 2005 Baseline)
2006-2010	69.3	15.7
2011-2015	69.3	15.7
2016-2020	69.3	15.7
2021-2025	69.3	15.7
2026-2030	0.0	0.0
2031-2035	0.0	0.0
Total for 2006-2035	277.1	62.9

These amounts are then subtracted from the residential PV and solar central receiver green power builds, respectively, for each region. However, if the prorated regional portion of the "Floors" additions was greater than the regional builds in the GPMM, only the amount predicted to be built by the GPMM was subtracted (i.e., value reported as zero, no negative numbers reported), as shown in **Tables 4 and 5**, for the base case and reference case, respectively.

Table 4. EIA "Floors" Incremental Capacity Subtracted from FY2006 GPMM - Base Case

Year Period	EIA PV "Floors" Capacity Additions Subtracted from the FY2006 GPMM (above 2005 Baseline)	EIA Solar Thermal "Floors" Capacity Additions Subtracted from the FY2006 GPMM (above 2005 Baseline)
2006-2010	0.0	7.4
2011-2015	0.0	10.9
2016-2020	0.0	7.9
2021-2025	0.0	4.8
2026-2030	0.0	0.0
2031-2035	0.0	0.0
Total for 2006-2035	0.0	31.0

Table 5. EIA "Floors" Incremental Capacity Subtracted from FY2006 GPMM - Reference Case

Year Period	EIA PV "Floors" Capacity Additions Subtracted from the FY2006 GPMM (above 2005 Baseline)	EIA Solar Thermal "Floors" Capacity Additions Subtracted from the FY2006 GPMM (above 2005 Baseline)
2006-2010	0.0	1.6
2011-2015	0.0	4.4
2016-2020	4.3	5.6
2021-2025	3.8	3.5
2026-2030	0.0	0.0
2031-2035	0.0	0.0
Total for 2006-2035	8.0	15.0

As can be seen in **Tables 4 and 5**, not all of the PV or solar thermal "floors" additions in **Table 3** were subtracted from the FY2006 GPMM model results. No Residential PV capacity is built by the model in the base case run, and very little capacity is built in the program case run, resulting in almost no PV subtractions in **Tables 4 and 5**. The solar central receiver technology competes better in the base case run, as its COE is more competitive relative to other renewable technologies in the base case. In both cases, the subtractions due to the "floors" capacity effectively eliminates the solar central receiver builds of the model, until after 2025, when no "floors" capacity is accounted for in NEMS.

Results

The results of the base case and program case runs of the model, and the incremental capacity between these two runs are shown in **Tables 6, 7 and 8**, respectively. The electricity generated from this capacity for the base case, program case runs, and the incremental difference is shown in **Tables 9, 10 and 11**, respectively. It should be noted that technologies with negative results in the incremental difference between the program and base cases are treated as zeros for inclusion in NEMS (i.e., no capacity additions for the technology due to penetration in the green power markets). A detailed accounting of the results for the base case and program cases is given by NEMS region, in **Appendix B**.

Table 6. Green Power Capacity Constructed in the GPMM- Base Case (MW)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	28	31	16	10	6	7	98	Total Biomass
Biomass Gasification	327	316	144	69	41	44	941	1,341
Landfill Gas	54	66	63	50	33	35	302	
Flash Geothermal	12	17	12	4	2	2	49	Total Geothermal
Binary Geothermal	12	17	12	4	2	2	49	183
Enhanced Geothermal Systems	5	14	17	22	13	14	85	
Solar Thermal Trough	9	14	9	5	3	3	44	Total Solar Thermal
Solar Thermal Dish Hybrid	7	10	7	4	2	3	34	83
Solar Central Receiver	0	0	0	0	2	3	5	
Residential PV	0	0	0	0	0	0	0	Total PV
Central Station PV	0	0	0	0	0	0	0	2
Concentrator PV	0	0	0	1	0	1	2	
Wind	762	632	256	119	72	77	1,920	Total Wind 1,920
GPMM Total	1,217	1,116	537	288	178	192	3,529	

Table 7. Green Power Capacity Constructed in the GPMM- Program Case (MW)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	27	35	26	11	6	6	111	Total Biomass
Biomass Gasification	182	175	90	35	18	19	519	918
Landfill Gas	60	64	60	47	27	29	287	
Flash Geothermal	7	10	6	5	3	3	34	Total Geothermal
Binary Geothermal	7	10	6	5	3	3	34	109
Enhanced Geothermal Systems	4	8	9	10	5	6	41.3	
Solar Thermal Trough	4	24	30	19	10	11	97	Total Solar Thermal
Solar Thermal Dish Hybrid	3	19	23	15	8	8	76	177
Solar Central Receiver	0	0	0	0	2	2	4	
Residential PV	773	1,761	1,348	385	0	0	4,267	Total PV
Central Station PV	0	0	0	0	1	1	2	4,280
Concentrator PV	0	0	4	4	1	1	11	
Wind	1,372	1,239	448	262	198	210	3,729	Total Wind 3,729
GPMM Total	2,440	3,344	2,051	796	282	300	9,212	

Table 8. Green Power Capacity Constructed in the GPMM- Incremental between Program Case and Base Case (MW)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	-1	4	10	1	0	-1	13	Total Biomass
Biomass Gasification	-145	-141	-54	-34	-23	-25	-422	-423
Landfill Gas	6	-2	-3	-3	-6	-6	-15	
Flash Geothermal	-5	-7	-6	1	1	1	-15	Total Geothermal
Binary Geothermal	-5	-7	-6	1	1	1	-15	-74
Enhanced Geothermal Systems	-1	-6	-8	-12	-8	-8	-43.7	
Solar Thermal Trough	-5	10	21	14	7	8	53	Total Solar Thermal
Solar Thermal Dish Hybrid	-4	9	16	11	6	5	42	94
Solar Central Receiver	0	0	0	0	0	-1	-1	
Residential PV	773	1,761	1,348	385	0	0	4,267	Total PV
Central Station PV	0	0	0	0	1	1	2	4,278
Concentrator PV	0	0	4	3	1	0	9	
Wind	610	607	192	143	126	133	1,809	Total Wind 1,809
GPMM Total	1,224	2,227	1,515	508	106	109	5,683	

Table 9. Green Power Generation from Capacity Constructed in the GPMM- Base Case (MWh)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	203,345	226,184	118,849	79,465	47,821	51,252	726,918	Total Biomass
Biomass Gasification	2,382,657	2,311,085	1,063,801	517,959	311,251	333,200	6,919,952	10,084,016
Landfill Gas	430,441	520,977	505,734	413,013	274,315	292,667	2,437,147	
Flash Geothermal	103,733	156,729	117,709	49,216	27,331	30,134	484,853	Total Geothermal
Binary Geothermal	103,733	156,729	117,709	49,216	27,331	30,134	484,853	969,705
Enhanced Geothermal Systems	0	0	0	0	0	0	0.0	
Solar Thermal Trough	11,655	17,187	12,269	7,502	4,379	4,779	57,771	Total Solar Thermal
Solar Thermal Dish Hybrid	11,655	17,187	12,269	7,502	4,379	4,779	57,771	132,629
Solar Central Receiver	1,945	2,803	1,949	1,233	4,379	4,779	17,088	
Residential PV	0	0	0	0	0	0	0	Total PV
Central Station PV	0	0	0	0	0	0	0	4,321
Concentrator PV	0	0	0	1,845	1,187	1,290	4,321	
Wind	2,613,395	2,218,216	927,525	452,599	272,147	292,004	6,775,886	Total Wind 6,775,886
GPMM Total	5,862,560	5,627,097	2,877,814	1,579,549	974,519	1,045,019	17,966,558	

Table 10. Green Power Generation from Capacity Constructed in the GPMM- Program Case (MWh)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	187,902	247,839	180,982	78,120	40,784	44,090	779,718	Total Biomass
Biomass Gasification	1,275,579	1,226,983	631,830	242,111	125,630	135,760	3,637,894	6,683,001
Landfill Gas	476,017	502,570	470,259	373,657	212,817	230,067	2,265,388	
Flash Geothermal	60,450	79,644	54,513	41,294	22,225	24,622	282,747	Total Geothermal
Binary Geothermal	60,450	79,644	54,513	41,294	22,225	24,622	282,747	872,025
Enhanced Geothermal Systems	26,650	58,742	66,084	71,331	39,702	44,022	306,531	
Solar Thermal Trough	16,109	84,255	107,385	67,047	36,097	39,192	350,084	Total Solar Thermal
Solar Thermal Dish Hybrid	16,109	84,255	107,385	67,047	36,097	39,192	350,084	784,998
Solar Central Receiver	3,774	12,958	19,760	12,695	16,983	18,659	84,831	
Residential PV	1,625,155	3,702,326	2,834,035	809,424	0	0	8,970,941	Total PV
Central Station PV	0	0	16	326	2,510	2,736	5,587	8,999,004
Concentrator PV	0	0	8,986	8,245	2,510	2,736	22,476	
Wind	5,622,554	5,265,935	1,928,285	1,164,033	887,251	934,466	15,802,523	Total Wind 15,802,523
GPMM Total	9,370,750	11,345,152	6,464,031	2,976,624	1,444,830	1,540,163	33,141,550	33,141,550

Table 11. Green Power Generation from Capacity Constructed in the GPMM- Incremental between Program Case and Base Case (MWh)

	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Specific Technology Totals	Cumulative RET Totals
Direct-Fired Biomass	-15,443	21,654	62,133	-1,345	-7,037	-7,162	52,801	Total Biomass
Biomass Gasification	-1,107,078	-1,084,101	-431,971	-275,847	-185,620	-197,440	-3,282,058	-3,401,016
Landfill Gas	45,576	-18,407	-35,475	-39,355	-61,498	-62,600	-171,758	
Flash Geothermal	-43,283	-77,085	-63,197	-7,922	-5,107	-5,512	-202,105	Total Geothermal
Binary Geothermal	-43,283	-77,085	-63,197	-7,922	-5,107	-5,512	-202,105	-97,680
Enhanced Geothermal Systems	26,650	58,742	66,084	71,331	39,702	44,022	306,531	
Solar Thermal Trough	4,454	67,068	95,116	59,544	31,718	34,413	292,313	Total Solar Thermal
Solar Thermal Dish Hybrid	4,454	67,068	95,116	59,544	31,718	34,413	292,313	652,369
Solar Central Receiver	1,829	10,155	17,812	11,463	12,605	13,880	67,743	
Residential PV	1,625,155	3,702,326	2,834,035	809,424	0	0	8,970,941	Total PV
Central Station PV	0	0	16	326	2,510	2,736	5,587	8,994,682
Concentrator PV	0	0	8,986	6,400	1,323	1,446	18,155	
Wind	3,009,158	3,047,719	1,000,759	711,434	615,104	642,462	9,026,636	Total Wind 9,026,636
GPMM Total	3,508,191	5,718,055	3,586,217	1,397,074	470,311	495,144	15,174,992	

1.4 Sources

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Appendices

Appendix A: National Results of the GPMM

Base Case

Cumulative Capacity Additions from 2003 Baseline (MW)

	2010	2015	2020	2025	2030	2035
Biomass (incl. LFG)	409	821	1,045	1,174	1,255	1,341
Geothermal	29	77	118	147	165	184
CSP	17	41	57	67	74	83
PV	0	0	0	1	1	2
Wind	762	1,395	1,651	1,770	1,842	1,920
Total	1,217	2,334	2,871	3,159	3,337	3,529

* Includes MSR additions for PV Residential and EIA "Floors" subtractions for PV Central Station and CSP Troughs

Green Revenues ($millions/period)

	2010	2015	2020	2025	2030	2035
Residential	265	259	132	72	42	45
Commercial	43	40	20	14	10	11
Industrial	14	13	7	5	4	4
Total ($millions/year)	322	312	160	91	56	60

Appendix A: National Results of the GPMM (Continued)

Program Case
Cumulative Capacity Additions from 2003 Baseline (MW)

	2010	2015	2020	2025	2030	2035
Biomass (incl. LFG)	269	543	719	812	863	918
Geothermal	18	45	67	86	97	109
CSP	7	50	103	136	156	177
PV	773	2,534	3,886	4,275	4,277	4,280
Wind	1,372	2,612	3,059	3,321	3,519	3,729
Total	2,440	5,784	7,835	8,631	8,912	9,212

* Includes MSR additions for PV Residential and EIA "Floors" subtractions for PV Central Station and CSP Troughs

Green Revenues ($millions/period)

	2010	2015	2020	2025	2030	2035
Residential	265	259	132	72	42	45
Commercial	43	40	20	14	10	11
Industrial	14	13	7	5	4	4
Total ($millions/year)	322	312	160	91	56	60

Appendix B: Capacity Installed by NEMS region

Capacity Installed by NEMS region- GPMM FY06- Base Case							
Direct Fired Biomass	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	3.2	3.9	2.2	1.3	0.8	0.8	12.3
2	2.7	3.8	2.4	1.4	0.9	1.0	12.3
3	6.8	5.2	0.9	0.8	0.6	0.7	15.1
4	1.8	2.1	1.1	0.6	0.4	0.4	6.5
5	0.2	0.5	0.5	0.3	0.1	0.1	1.8
6	4.4	3.2	0.3	0.3	0.3	0.3	8.9
7	4.0	2.8	0.5	0.6	0.5	0.6	9.0
8	0.3	0.9	1.1	0.6	0.3	0.3	3.6
9	1.0	2.8	3.2	1.9	0.8	0.9	10.7
10	2.8	4.1	2.7	1.6	1.0	1.0	13.2
11	0.2	0.4	0.4	0.3	0.2	0.2	1.6
12	0.4	0.6	0.5	0.4	0.2	0.3	2.4
13	0.1	0.2	0.3	0.2	0.1	0.1	0.9
Total	28	31	16	10	6	7	98

Biomass Gasification	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	41.5	44.0	22.2	10.0	6.0	6.3	130.0
2	30.6	37.6	21.1	9.1	5.9	6.4	110.7
3	90.8	61.0	8.9	6.1	4.9	5.1	176.8
4	24.3	23.9	10.5	4.8	3.1	3.3	69.8
5	2.9	5.5	4.3	1.9	0.7	0.8	16.2
6	59.1	37.2	2.5	2.6	2.6	2.7	106.6
7	23.0	13.5	2.1	2.1	1.8	1.9	44.4
8	4.3	10.6	10.2	4.4	1.9	2.1	33.6
9	12.9	31.8	30.6	13.3	5.8	6.4	100.8
10	31.3	40.3	23.7	10.2	6.2	6.8	118.6
11	2.1	3.4	2.5	1.4	0.8	0.9	11.1
12	3.3	4.9	3.3	2.0	1.3	1.4	16.0
13	0.9	2.0	1.9	0.8	0.3	0.3	6.1
Total	327	316	144	69	41	44	941

Landfill Gas	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	7.8	8.4	8.4	7.2	4.3	4.5	40.5
2	5.2	5.2	5.2	5.2	4.9	5.2	31.1
3	5.5	6.1	5.0	4.4	3.5	3.6	28.2
4	3.7	3.7	3.7	3.4	2.2	2.3	18.9
5	1.2	3.2	3.1	1.6	0.6	0.6	10.4
6	2.5	2.5	1.8	1.8	1.8	1.8	12.2
7	2.4	2.4	2.4	2.4	2.4	2.4	14.5
8	3.6	4.8	4.8	3.4	1.5	1.6	19.7
9	10.7	14.3	14.3	10.2	4.5	4.9	59.0
10	5.9	7.4	7.4	6.3	5.2	5.6	37.8
11	2.0	2.4	2.3	1.5	0.8	0.9	9.9
12	3.0	3.0	3.0	2.1	1.3	1.5	13.9
13	1.0	2.0	1.9	0.9	0.3	0.3	6.4
Total	54	66	63	50	33	35	302

Capacity Installed by NEMS region- GPMM FY06- Base Case (Continued)

Binary Geothermal	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	4.1	5.7	3.9	1.3	0.8	0.8	16.5
12	6.4	8.5	5.3	1.8	1.2	1.3	24.6
13	1.4	2.8	2.5	0.8	0.3	0.3	8.2
Total	12	17	12	4	2	2	49

Flash Geothermal	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	4.1	5.7	3.9	1.3	0.8	0.8	16.5
12	6.4	8.5	5.3	1.8	1.2	1.3	24.6
13	1.4	2.8	2.5	0.8	0.3	0.3	8.2
Total	12	17	12	4	2	2	49

Enhanced Geothermal Systems	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	1.8	4.6	5.5	7.3	4.4	4.8	28.5
12	2.8	6.7	7.4	10.5	6.9	7.7	41.9
13	0.7	2.6	4.1	4.3	1.5	1.6	14.8
Total	5	14	17	22	13	14	85

Capacity Installed by NEMS region- GPMM FY06- Base Case (Continued)

Solar Thermal Dish-Hybrid	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	2.9	3.8	2.4	1.2	0.8	0.9	12.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.1	0.3	0.3	0.2	0.0	0.0	0.8
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	3.0	4.0	2.6	1.3	0.8	0.9	12.6
11	0.4	0.8	0.6	0.4	0.2	0.2	2.7
12	0.6	1.0	0.7	0.5	0.3	0.4	3.5
13	0.2	0.6	0.7	0.3	0.1	0.1	2.1
Total	7	10	7	4	2	3	34

Solar Central Receiver	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.8	0.9	1.6
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.1
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.8	0.9	1.7
11	0.0	0.0	0.0	0.0	0.2	0.2	0.5
12	0.0	0.0	0.0	0.0	0.3	0.4	0.7
13	0	0	0	0	0	0	0
Total	0	0	0	0	2	3	5

Solar Thermal Trough	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	3.8	5.0	3.1	1.6	1.0	1.1	15.7
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.1	0.3	0.4	0.2	0.1	0.1	1.1
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	3.9	5.3	3.4	1.7	1.1	1.2	16.5
11	0.5	1.0	0.8	0.5	0.3	0.3	3.5
12	0.8	1.3	1.0	0.7	0.4	0.5	4.6
13	0.3	0.8	0.9	0.5	0.2	0.2	2.8
Total	9	14	9	5	3	3	44

* Includes Subtractions of NEMS "Floor" Capacity Additions

Capacity Installed by NEMS region- GPMM FY06- Base Case (Continued)

PV Residential	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.00	0.00

Central Station PV	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.0	0.0	0.0	0.0
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.0	0.0	0.0	0.0
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.00	0.00

* Includes Subtractions of NEMS "Floor" Capacity Additions

Concentrator PV	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
2	0.0	0.0	0.0	0.4	0.2	0.3	0.9
3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
7	0.0	0.0	0.0	0.0	0.0	0.0	0.0
8	0.0	0.0	0.0	0.0	0.0	0.0	0.0
9	0.0	0.0	0.0	0.0	0.0	0.0	0.0
10	0.0	0.0	0.0	0.4	0.2	0.3	0.9
11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total	0	0	0	1	0	1	2

Capacity Installed by NEMS region- GPMM FY06- Base Case (Continued)							
Wind	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	89.3	83.3	36.8	16.0	9.6	10.2	245.2
2	73.2	81.3	39.8	17.0	11.0	12.0	234.3
3	134.3	81.3	12.3	7.8	5.9	6.1	247.7
4	50.9	45.9	17.9	7.8	5.0	5.3	132.7
5	6.1	9.5	6.5	2.9	1.1	1.2	27.3
6	85.0	48.3	3.0	2.9	2.9	3.0	145.1
7	175.9	96.9	13.9	8.5	7.2	7.5	309.9
8	13.6	17.8	15.6	6.8	3.0	3.3	60.1
9	40.7	53.3	46.9	20.5	9.1	9.9	180.4
10	74.7	85.6	43.6	18.7	11.6	12.6	246.8
11	6.3	9.6	6.4	3.4	1.9	2.2	29.8
12	9.6	13.3	8.1	4.7	3.0	3.3	42.0
13	2.8	6.3	5.5	2.3	0.8	0.8	18.5
Total	762	632	256	119	72	77	1,920

Appendix B: Capacity Installed by NEMS region (Continued)

Capacity Installed by NEMS region- GPMM FY06- Program Case							
Direct Fired Biomass	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	3	4	3	1	1	1	13
2	2	3	2	1	1	1	9
3	5	5	2	1	1	1	14
4	2	2	1	0	0	0	5
5	0	0	0	0	0	0	1
6	3	2	0	0	0	0	7
7	4	2	0	0	0	0	8
8	1	3	3	1	1	1	9
9	3	9	9	4	2	2	28
10	2	3	2	1	1	1	10
11	0	1	1	0	0	0	2
12	0	1	1	0	0	0	3
13	0	0	0	0	0	0	1
Total	27	35	26	11	6	6	111

Biomass Gasification	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	23	22	12	5	2	3	67
2	15	14	7	3	2	2	42
3	42	27	7	3	2	2	83
4	12	9	4	2	1	1	28
5	1	2	2	1	0	0	6
6	26	13	1	1	1	1	42
7	12	5	1	1	0	1	20
8	8	15	11	4	2	2	42
9	23	46	34	12	5	5	125
10	15	15	8	3	2	2	45
11	2	2	1	1	0	0	6
12	2	3	2	1	1	1	9
13	1	1	1	0	0	0	3
Total	182	175	90	35	18	19	519

Landfill Gas	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	8	8	8	6	3	3	38
2	5	5	5	4	3	3	26
3	6	6	4	4	3	3	26
4	4	4	4	2	1	1	16
5	1	2	2	1	0	0	7
6	3	3	1	1	1	1	9
7	2	2	2	2	1	2	12
8	5	5	5	5	2	3	24
9	14	14	14	14	7	8	72
10	6	7	7	5	3	3	30
11	2	2	2	1	1	1	9
12	3	3	3	2	1	1	13
13	1	2	2	1	0	0	6
Total	60	64	60	47	27	29	287

Capacity Installed by NEMS region- GPMM FY06- Program Case (Cont.)

Binary Geothermal	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	2	3	2	2	1	1	11
12	4	5	3	2	1	2	16
13	1	2	2	1	0	0	6
Total	7	10	6	5	3	3	34

Flash Geothermal	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	2	3	2	2	1	1	11
12	4	5	3	2	1	2	16
13	1	2	2	1	0	0	6
Total	7	10	6	5	3	3	34

Enhanced Geothermal Systems	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0
11	1	3	3	3	2	2	14
12	2	4	4	5	3	3	20
13	0	1	2	2	1	1	7
Total	4	8	9	10	5	6	41

Capacity Installed by NEMS region- GPMM FY06- Program Case (Cont.)

Solar Thermal Dish-Hybrid	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	2	2	2	1	1	8
2	1	2	2	1	1	1	9
3	0	2	1	1	1	1	6
4	0	1	1	1	0	0	3
5	0	0	0	0	0	0	1
6	0	1	0	0	0	0	2
7	0	1	0	0	0	0	3
8	0	1	2	1	1	1	6
9	1	4	7	4	2	2	19
10	1	2	3	2	1	1	9
11	0	1	1	1	0	0	3
12	0	1	1	1	1	1	5
13	0	0	1	1	0	0	2
Total	3	19	23	15	8	8	76

Solar Central Receiver	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	0
2	0	0	0	0	1	1	1
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	0	0	0	0	1	1	1
11	0	0	0	0	0	0	1
12	0	0	0	0	0	0	1
13	0	0	0	0	0	0	0
Total	0	0	0	0	2	2	4

Solar Thermal Trough	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	2	3	2	1	1	10
2	1	3	3	2	1	1	11
3	0	3	2	1	1	1	8
4	0	1	1	1	0	0	3
5	0	0	0	0	0	0	1
6	0	1	0	0	0	0	3
7	0	1	1	1	0	0	3
8	0	2	3	2	1	1	8
9	1	5	9	5	2	2	24
10	1	3	3	2	1	1	12
11	0	1	1	1	1	1	4
12	0	1	2	1	1	1	6
13	0	1	1	1	0	0	3
Total	4	24	30	19	10	11	97

* Includes Subtractions of NEMS "Floor" Capacity Additions

Capacity Installed by NEMS region- GPMM FY06- Program Case (Cont.)							
PV Residential	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	80	183	140	40	0	0	443
2	73	167	127	36	0	0	404
3	70	159	122	35	0	0	385
4	21	47	36	10	0	0	113
5	5	12	9	3	0	0	29
6	15	35	27	8	0	0	84
7	20	47	36	10	0	0	113
8	94	214	164	47	0	0	518
9	282	641	491	140	0	0	1,554
10	76	173	132	38	0	0	418
11	13	31	23	7	0	0	74
12	24	54	42	12	0	0	132
13	0	0	0	0	0	0	0
Total	773	1,761	1,348	385	0	0	4,267

* Includes Additions of MSR Capacity Additions

Central Station PV	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	0	0	0	0	0
9	0	0	0	0	1	1	1
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
Total	0	0	0	0	1	1	2

* Includes Subtractions of NEMS "Floor" Capacity Additions

Concentrator PV	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0
3	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0
6	0	0	0	0	0	0	0
7	0	0	0	0	0	0	0
8	0	0	1	1	0	0	2
9	0	0	3	2	1	1	6
10	0	0	0	0	0	0	0
11	0	0	0	0	0	0	0
12	0	0	0	0	0	0	0
13	0	0	0	0	0	0	0
Total	0	0	4	4	1	1	11

Capacity Installed by NEMS region- GPMM FY06- Program Case (Cont.)							
Wind	2006-2010	2011-2015	2016-2020	2021-2025	2026-2030	2031-2035	Total
1	160	164	69	39	27	28	487
2	142	179	91	46	36	38	532
3	316	204	16	18	19	20	592
4	99	101	43	24	16	17	300
5	13	27	21	11	4	4	79
6	210	136	11	12	13	13	395
7	231	139	22	20	19	19	450
8	0	0	0	0	0	0	0
9	0	0	0	0	0	0	0
10	146	192	104	52	38	41	573
11	18	33	23	14	9	10	107
12	28	47	32	20	14	15	156
13	7	18	17	8	3	3	57
Total	1,372	1,239	448	262	198	210	3,729

Appendix C: Regional Green Power Access and Market Penetration Parameters

Fraction of each region assumed to have competitively set electricity rates in the AEO2004

NEMS Regions	2005	2010	2015	2020	2025	2030	2035
1 ECAR	32%	63%	63%	63%	63%	63%	63%
2 ERCOT	40%	90%	100%	100%	100%	100%	100%
3 Mid Atlantic	70%	100%	100%	100%	100%	100%	100%
4 MAIN	33%	55%	55%	55%	55%	55%	55%
5 MAPP	0%	0%	0%	0%	0%	0%	0%
6 New York	70%	100%	100%	100%	100%	100%	100%
7 New England	70%	100%	100%	100%	100%	100%	100%
8 Florida	0%	0%	0%	0%	0%	0%	0%
9 SERC	7%	13%	13%	13%	13%	13%	13%
10 SPP	12%	33%	41%	41%	41%	41%	41%
11 NWP	10%	22%	25%	25%	25%	25%	25%
12 RA	26%	59%	65%	65%	65%	65%	65%
13 California	5%	5%	5%	5%	5%	5%	5%

Fraction of each region assumed to have competitively set electricity rates in the AEO2004

Census Regions	2005	2010	2015	2020	2025	2030	2035
1 New England	70%	100%	100%	100%	100%	100%	100%
2 Mid. Atlantic	70%	100%	100%	100%	100%	100%	100%
3 E. N. Central	31%	58%	58%	58%	58%	58%	58%
4 W.N. Central	5%	14%	18%	18%	18%	18%	18%
5 S. Atl. & E.S. Central	14%	24%	24%	24%	24%	24%	24%
6 W.S. Central	26%	62%	71%	71%	71%	71%	71%
7 Mountain	20%	46%	51%	51%	51%	51%	51%
8 Pacific	6%	9%	10%	10%	10%	10%	10%

Percent of All Customers Participating in Green Programs (both marketing and pricing)

	2005	2010	2015	2020	2025	2030	2035
New England	4.2%	10.7%	13.9%	14.1%	14.2%	14.2%	14.2%
Mid. Atlantic	4.0%	10.6%	14.3%	14.3%	14.3%	14.3%	14.3%
E. N. Central	1.1%	4.2%	6.8%	7.7%	7.9%	7.9%	7.9%
W.N. Central	0.0%	0.3%	1.1%	1.8%	2.0%	2.0%	2.0%
S. Atl. & E.S. Central	0.2%	0.8%	1.8%	2.6%	2.9%	2.9%	2.9%
W.S. Central	0.7%	3.9%	7.2%	8.5%	8.8%	8.8%	8.8%
Mountain	0.6%	2.6%	5.1%	6.3%	6.8%	6.8%	6.8%
Pacific	0.0%	0.2%	0.7%	1.1%	1.2%	1.2%	1.2%

Appendix C: Regional Green Power Access and Market Penetration Parameters (Cont.)

Customer Penetration Yearly Addition- Incremental Penetration

	2005	2010	2015	2020	2025	2030	2035
New England	1.3%	0.9%	0.7%	0.0%	0.0%	0.0%	0.0%
Mid. Atlantic	1.4%	1.0%	0.7%	0.0%	0.0%	0.0%	0.0%
E. N. Central	0.5%	0.7%	0.5%	0.2%	0.0%	0.0%	0.0%
W.N. Central	0.0%	0.1%	0.2%	0.1%	0.0%	0.0%	0.0%
S. Atl. & E.S. Central	0.1%	0.1%	0.2%	0.2%	0.1%	0.0%	0.0%
W.S. Central	0.4%	0.8%	0.6%	0.3%	0.1%	0.0%	0.0%
Mountain	0.3%	0.5%	0.4%	0.3%	0.1%	0.0%	0.0%
Pacific	0.0%	0.1%	0.1%	0.1%	0.0%	0.0%	0.0%

Appendix D: Regional Adjustment Factors and Capacity Factors

Direct-Fired Biomass		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
New England	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Mid. Atlantic	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
E. N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
W.N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
S. Atl. & E.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
W.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

Biomass Gasification		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
New England	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Mid. Atlantic	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
E. N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
W.N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
S. Atl. & E.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
W.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%	80.00%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)

Landfill Gas		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
New England	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
Mid. Atlantic	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
E. N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
W.N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
S. Atl. & E.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
W.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%	90.00%

Flash Geothermal		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
New England	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mid. Atlantic	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E. N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
S. Atl. & E.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	93.00%	95.00%	95.50%	96.00%	96.00%	96.00%	96.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	93.00%	95.00%	95.50%	96.00%	96.00%	96.00%	96.00%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)

Binary Geothermal		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	93.00%	95.00%	95.50%	96.00%	96.00%	96.00%	96.00%
New England	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mid. Atlantic	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E. N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
S. Atl. & E.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	93.00%	95.00%	95.50%	96.00%	96.00%	96.00%	96.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	93.00%	95.00%	95.50%	96.00%	96.00%	96.00%	96.00%

Enhanced Geothermal Systems		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	82.00%	83.00%	84.00%	85.00%	85.00%	85.00%	85.00%
New England	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mid. Atlantic	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E. N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
S. Atl. & E.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	82.00%	83.00%	84.00%	85.00%	85.00%	85.00%	85.00%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	82.00%	83.00%	84.00%	85.00%	85.00%	85.00%	85.00%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)

CSP Trough		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	41.70%	51.20%	51.20%	51.20%	51.20%	51.20%	51.20%
New England	Adjustment	0.69	0.69	0.69	0.69	0.69	0.69	0.69
	Cap Factor	28.84%	35.41%	35.41%	35.41%	35.41%	35.41%	35.41%
Mid. Atlantic	Adjustment	0.70	0.70	0.70	0.70	0.70	0.70	0.70
	Cap Factor	29.32%	36.00%	36.00%	36.00%	36.00%	36.00%	36.00%
E. N. Central	Adjustment	0.72	0.72	0.72	0.72	0.72	0.72	0.72
	Cap Factor	29.99%	36.82%	36.82%	36.82%	36.82%	36.82%	36.82%
W.N. Central	Adjustment	0.81	0.81	0.81	0.81	0.81	0.81	0.81
	Cap Factor	33.90%	41.62%	41.62%	41.62%	41.62%	41.62%	41.62%
S. Atl. & E.S. Central	Adjustment	0.75	0.75	0.75	0.75	0.75	0.75	0.75
	Cap Factor	31.37%	38.52%	38.52%	38.52%	38.52%	38.52%	38.52%
W.S. Central	Adjustment	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	Cap Factor	38.09%	46.77%	46.77%	46.77%	46.77%	46.77%	46.77%
Mountain	Adjustment	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	Cap Factor	40.96%	50.29%	50.29%	50.29%	50.29%	50.29%	50.29%
Pacific	Adjustment	0.84	0.84	0.84	0.84	0.84	0.84	0.84
	Cap Factor	34.82%	42.76%	42.76%	42.76%	42.76%	42.76%	42.76%

Solar Thermal Dish- Hybrid		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%	50.00%
New England	Adjustment	0.91	0.91	0.91	0.91	0.91	0.91	0.91
	Cap Factor	45.28%	45.28%	45.28%	45.28%	45.28%	45.28%	45.28%
Mid. Atlantic	Adjustment	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Cap Factor	45.95%	45.95%	45.95%	45.95%	45.95%	45.95%	45.95%
E. N. Central	Adjustment	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	Cap Factor	46.94%	46.94%	46.94%	46.94%	46.94%	46.94%	46.94%
W.N. Central	Adjustment	1.06	1.06	1.06	1.06	1.06	1.06	1.06
	Cap Factor	53.23%	53.23%	53.23%	53.23%	53.23%	53.23%	53.23%
S. Atl. & E.S. Central	Adjustment	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	Cap Factor	49.08%	49.08%	49.08%	49.08%	49.08%	49.08%	49.08%
W.S. Central	Adjustment	1.19	1.19	1.19	1.19	1.19	1.19	1.19
	Cap Factor	59.71%	59.71%	59.71%	59.71%	59.71%	59.71%	59.71%
Mountain	Adjustment	1.29	1.29	1.29	1.29	1.29	1.29	1.29
	Cap Factor	64.28%	64.28%	64.28%	64.28%	64.28%	64.28%	64.28%
Pacific	Adjustment	1.09	1.09	1.09	1.09	1.09	1.09	1.09
	Cap Factor	54.46%	54.46%	54.46%	54.46%	54.46%	54.46%	54.46%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)

Solar Central Receiver		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	44.00%	65.00%	71.00%	77.00%	77.00%	77.00%	77.00%
New England	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Mid. Atlantic	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
E. N. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.N. Central	Adjustment	1.06	1.06	1.06	1.06	1.06	1.06	1.06
	Cap Factor	46.84%	69.20%	75.59%	81.97%	81.97%	81.97%	81.97%
S. Atl. & E.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.S. Central	Adjustment	1.19	1.19	1.19	1.19	1.19	1.19	1.19
	Cap Factor	52.54%	77.62%	84.78%	91.95%	91.95%	91.95%	91.95%
Mountain	Adjustment	1.29	1.29	1.29	1.29	1.29	1.29	1.29
	Cap Factor	56.57%	83.57%	91.28%	99.00%	99.00%	99.00%	99.00%
Pacific	Adjustment	1.09	1.09	1.09	1.09	1.09	1.09	1.09
	Cap Factor	47.92%	70.80%	77.33%	83.87%	83.87%	83.87%	83.87%

Residential PV		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%
New England	Adjustment	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Cap Factor	22.10%	22.10%	22.10%	22.10%	22.10%	22.10%	22.10%
Mid. Atlantic	Adjustment	0.93	0.93	0.93	0.93	0.93	0.93	0.93
	Cap Factor	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%
E. N. Central	Adjustment	0.95	0.95	0.95	0.95	0.95	0.95	0.95
	Cap Factor	22.68%	22.68%	22.68%	22.68%	22.68%	22.68%	22.68%
W.N. Central	Adjustment	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Cap Factor	25.12%	25.12%	25.12%	25.12%	25.12%	25.12%	25.12%
S. Atl. & E.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	24.04%	24.04%	24.04%	24.04%	24.04%	24.04%	24.04%
W.S. Central	Adjustment	1.17	1.17	1.17	1.17	1.17	1.17	1.17
	Cap Factor	28.05%	28.05%	28.05%	28.05%	28.05%	28.05%	28.05%
Mountain	Adjustment	1.22	1.22	1.22	1.22	1.22	1.22	1.22
	Cap Factor	29.21%	29.21%	29.21%	29.21%	29.21%	29.21%	29.21%
Pacific	Adjustment	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	Cap Factor	25.79%	25.79%	25.79%	25.79%	25.79%	25.79%	25.79%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)

Central Station PV		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%	24.00%
New England	Adjustment	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Cap Factor	22.10%	22.10%	22.10%	22.10%	22.10%	22.10%	22.10%
Mid. Atlantic	Adjustment	0.93	0.93	0.93	0.93	0.93	0.93	0.93
	Cap Factor	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%	22.35%
E. N. Central	Adjustment	0.95	0.95	0.95	0.95	0.95	0.95	0.95
	Cap Factor	22.68%	22.68%	22.68%	22.68%	22.68%	22.68%	22.68%
W.N. Central	Adjustment	1.05	1.05	1.05	1.05	1.05	1.05	1.05
	Cap Factor	25.12%	25.12%	25.12%	25.12%	25.12%	25.12%	25.12%
S. Atl. & E.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	24.04%	24.04%	24.04%	24.04%	24.04%	24.04%	24.04%
W.S. Central	Adjustment	1.17	1.17	1.17	1.17	1.17	1.17	1.17
	Cap Factor	28.05%	28.05%	28.05%	28.05%	28.05%	28.05%	28.05%
Mountain	Adjustment	1.22	1.22	1.22	1.22	1.22	1.22	1.22
	Cap Factor	29.21%	29.21%	29.21%	29.21%	29.21%	29.21%	29.21%
Pacific	Adjustment	1.07	1.07	1.07	1.07	1.07	1.07	1.07
	Cap Factor	25.79%	25.79%	25.79%	25.79%	25.79%	25.79%	25.79%

Concentrator PV		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	24.20%	24.20%	24.20%	24.20%	24.20%	24.20%	24.20%
New England	Adjustment	0.90	0.90	0.90	0.90	0.90	0.90	0.90
	Cap Factor	21.86%	21.86%	21.86%	21.86%	21.86%	21.86%	21.86%
Mid. Atlantic	Adjustment	0.92	0.92	0.92	0.92	0.92	0.92	0.92
	Cap Factor	22.23%	22.23%	22.23%	22.23%	22.23%	22.23%	22.23%
E. N. Central	Adjustment	0.94	0.94	0.94	0.94	0.94	0.94	0.94
	Cap Factor	22.74%	22.74%	22.74%	22.74%	22.74%	22.74%	22.74%
W.N. Central	Adjustment	1.06	1.06	1.06	1.06	1.06	1.06	1.06
	Cap Factor	25.70%	25.70%	25.70%	25.70%	25.70%	25.70%	25.70%
S. Atl. & E.S. Central	Adjustment	0.98	0.98	0.98	0.98	0.98	0.98	0.98
	Cap Factor	23.78%	23.78%	23.78%	23.78%	23.78%	23.78%	23.78%
W.S. Central	Adjustment	1.19	1.19	1.19	1.19	1.19	1.19	1.19
	Cap Factor	28.88%	28.88%	28.88%	28.88%	28.88%	28.88%	28.88%
Mountain	Adjustment	1.28	1.28	1.28	1.28	1.28	1.28	1.28
	Cap Factor	31.05%	31.05%	31.05%	31.05%	31.05%	31.05%	31.05%
Pacific	Adjustment	1.09	1.09	1.09	1.09	1.09	1.09	1.09
	Cap Factor	26.40%	26.40%	26.40%	26.40%	26.40%	26.40%	26.40%

Appendix D: Regional Adjustment Factors and Capacity Factors (Continued)								
Wind		2005	2010	2015	2020	2025	2030	2035
National	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
New England	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
Mid. Atlantic	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
E. N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
W.N. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
S. Atl. & E.S. Central	Adjustment	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	Cap Factor	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
W.S. Central	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
Mountain	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%
Pacific	Adjustment	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	Cap Factor	46.68%	46.77%	48.50%	49.14%	50.76%	51.14%	50.90%